

## APPROXIMATION OF FIXED POINTS FOR MULTI-VALUED $G$ -NONEXPANSIVE MAPPINGS THROUGH ULLAH ITERATION SCHEME IN UNIFORMLY CONVEX BANACH SPACES ENDOWED WITH GRAPH

KIRAN DEWANGAN<sup>†</sup> AND NIYATI GURUDWAN

Date of Receiving : 12. 09. 2022  
Date of Revision : 21. 11. 2022  
Date of Acceptance : 02. 12. 2022

**Abstract.** In this paper, we deal with the approximation of fixed points for multi-valued  $G$ -nonexpansive mappings through Ullah iteration process in uniformly convex Banach space. With the help of Matlab Software Program, we compare different established iterative schemes for multi-valued nonexpansive mapping.

### 1. Introduction

The theory of fixed points of single-valued as well as multi-valued mappings have a great implications in existence and approximate solutions of optimization problems, convex feasibility problems, integral equations, differential equations etc. In fact the technique of fixed point also have been applied in different fields such as biology, physics, engineering, chemistry, game theory, economics, computer science etc.

Fixed point theorems are developed for single-valued as well as multi-valued functions over different spaces. Banach contraction principle [3] is one of the pioneering work in the field of fixed point theory and widely used to find out solutions of different problems in the field of analysis. The interest in the study of nonexpansive mapping was basically motivated by Browder's [4] work on relationship between monotone operators and nonexpansive mappings and the significance of the geometric properties of the norm for the existence of fixed point for nonexpansive mapping given by Kirk [12].

A mapping  $T : X \rightarrow X$  is called nonexpansive mapping if  $\|Tx - Ty\| \leq \|x - y\|$ , for all  $x, y \in X$ . Nonexpansive mappings appear in many nonlinear equations for which the

---

2010 *Mathematics Subject Classification.* 47H09, 47H10.

*Key words and phrases.* Uniformly convex Banach space, Fixed point, Multi-valued  $G$ -nonexpansive mappings, Fejer monotone.

*Communicated by.* Virender

<sup>†</sup> *Corresponding author*